## WHAT IS CLAIMED IS:

1.      An apparatus for transmitting a sequence for channel estimation in a mobile communication system including M transmission antennas, P
5 encoders for receiving P information bit streams and encoding the received P information bit streams with a space-time trellis code (STTC), and M modulators for modulating information bit streams output from the P encoders in a predetermined modulation scheme and outputting modulation symbol streams, the apparatus comprising:
10      a sequence generator for generating the sequence for the channel estimation;

M puncturers for puncturing at least one modulation symbol in a predetermined position for each of the modulation symbol streams output from the M modulators; and
15      M multiplexers individually connected to the M transmission antennas, for multiplexing signals output from the M puncturers and the sequence inserted in the punctured modulation symbol.

2.      The apparatus of claim 1, wherein the M puncturers each have a
20 same number of modulation symbols where the sequence is inserted, for the modulation symbol streams output from the M modulators.

3.      The apparatus of claim 1, wherein the M puncturers each periodically repeat a position where the sequence is inserted, for the modulation
25 symbol streams output from the M modulators.

4.      The apparatus of clam 1, wherein the sequence is a pilot sequence.

5.      The apparatus of claim 4, wherein a frame format transmitted through each of the M transmission antennas is set so that the M transmission antennas have different positions where the pilot sequence is inserted.

5        6.      The apparatus of claim 1, wherein if M is 2 and a number of symbols constituting the modulation symbol stream is 4, a position where the sequence is inserted is determined according to a puncturing matrix $P_1$ defined as

$$P_1 = \begin{bmatrix} 1 & 1 & 1 & 0 \\ 1 & 0 & 1 & 1 \end{bmatrix}$$

wherein a column corresponds to a transmission period, a row corresponds to a

10     transmission antenna, and the sequence is inserted in a position of an element "0."

7.      The apparatus of claim 1, wherein if M is 2 and a number of symbols constituting the modulation symbol stream is 6, a position where the

15     sequence is inserted is determined according to a puncturing matrix $P_2$ defined as

$$P_2 = \begin{bmatrix} 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 & 1 & 1 & 0 \\ 1 & 1 & 0 & 1 & 1 & 1 & 1 & 1 & 0 & 1 & 1 & 1 \end{bmatrix}$$

wherein a column corresponds to a transmission period, a row corresponds to a transmission antenna, and the sequence is inserted in a position of an element "0."

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8.      A method for transmitting a sequence for channel estimation in a mobile communication system including M transmission antennas, P encoders for receiving P information bit streams and encoding the received P information bit streams with a space-time trellis code (STTC), and M modulators for

25     modulating information bit streams output form the P encoders in a predetermined modulation scheme and outputting modulation symbol streams, the method comprising the steps of:

generating the sequence for the channel estimation; and

transmitting the sequence in substitute for at least one modulation symbol in a predetermined position through the M transmission antennas, for each of the modulation symbol streams output from the M modulators.

5      9.      The method of claim 8, wherein number of sequences inserted in modulation symbol streams output from the M modulators are identical.

10.      The method of claim 8, wherein the predetermined position where the sequence is inserted is periodically repeated for modulation symbol 10 streams output from the M modulators.

11.      The method of claim 8, wherein the sequence is a pilot sequence.

12.      The method of claim 8, wherein if M is 2 and a number of 15 symbols constituting the modulation symbol stream is 4, the predetermined position where the sequence is inserted is determined according to a puncturing matrix $P_1$ defined as

$$P_1 = \begin{bmatrix} 1 & 1 & 1 & 0 \\ 1 & 0 & 1 & 1 \end{bmatrix}$$

wherein a column corresponds to a transmission period, a row corresponds to a 20 transmission antenna, and the sequence is inserted in a position of an element "0."

13.      An apparatus for receiving a sequence for channel estimation in a mobile communication system which receives through N reception antennas 25 modulation symbol streams transmitted by a transmitter through M transmission antennas, the apparatus comprising:

N demultiplexers individually connected to the N reception antennas, for outputting a reception symbol in at least one predetermined position as the

sequence for the channel estimation, for each reception symbol stream output from the N reception antennas; and

a channel estimator for performing channel estimation by using sequences for channel estimation, output from the N demultiplexers.

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14.    The apparatus of claim 13, wherein the N demultiplexers each have same number of symbols output as the sequence, for the reception symbol streams.

10    15.    The apparatus of claim 13, wherein the N demultiplexers each periodically repeat a position of symbols output as the sequence, for the reception symbol streams.

16.    The apparatus of claim 13, wherein the sequence is a pilot 15 sequence.

17.    A method for receiving a sequence for channel estimation in a mobile communication system which receives through N reception antennas modulation symbol streams transmitted by a transmitter through M transmission 20 antennas, the method comprising the steps of:

outputting a reception symbol in at least one predetermined position as sequence for the channel estimation, for each reception symbol stream output from the N reception antennas; and

performing the channel estimation by using the sequences for the 25 channel estimation.

18.    The method of claim 17, wherein the reception symbol streams have a same number of symbols output as the sequence.

19.     The method of claim 17, wherein the at least one predetermined position of symbols output as the sequence is periodically repeated for the reception symbol streams.

5       20.     The method of claim 17, wherein the sequence is a pilot sequence.